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BOTANICAL NEWS. — Professor Seymour's lecture before the Minnesota Horticultural Society, in January last, is a model of what such a lecture should be. It deals plainly with a few common but imperfectly understood fungi of the fruit-garden, viz., the rusts of the raspberry and blackberry (*Cæoma nitens* and *Phragmidium rubi-idaei*); the "double blossom" of the blackberry (*Fusicorporium rubi*); the raspberry "cane rust" (probably *Sphaceloma ampelinum*); and the currant disease (*Septoria ribis*). The lecture, now published in pamphlet form, closes with a few well-chosen remarks about the investigation of the parasitic fungi. — Professor Tracy has just published in the eighteenth annual report of the State Board of Agriculture a catalogue of the flora of Missouri. It includes phanerogams and pteridophytes only, and yet there are enumerated 1749 species. A study of the list shows the State to contain four well-defined botanical regions: (1) The Mississippi and Missouri river-bottoms; (2) the swamp region of the south-east; (3) the Ozark region, south of the Missouri river; (4) the prairie region of the northern and western portions of the State. — The Botanical Club of the American Association for the Advancement of Science will hold meetings in August at Buffalo, and will meet with a warm reception from the botanists and citizens of Buffalo. Although the arrangements are not yet completed, it can quite confidently be announced that the club will be tendered a half-day excursion to some one of the several interesting collecting grounds of that vicinity. The long excursion on Saturday will also be arranged to enable the botanists to have a portion of the time for collecting. The localities near the city which have been described by Mr. Day in his catalogue of Buffalo plants will prove as interesting to visiting botanists as those of any city yet visited by the club. There will also be tendered to the club, without doubt, an evening reception. There will be no lack of opportunities for becoming acquainted with one another. The first meeting of the club will be held in the room assigned to biology on Thursday morning at 9 o'clock, which is the second day of the association. Subsequent meetings will be announced on the daily programme of the association. It is hoped that the botanists will be out in still larger numbers this year than they were last, or the year before. Let every teacher of botany arrange now to be present at the meetings. The secretary of the club is J. C. Arthur, of Geneva, N. Y.

ENTOMOLOGY.

DESCRIPTION OF THE FORM OF THE FEMALE IN A LAMPYRID (ZARHIPIS RIVERSI HORN.) —

♀. Apterous, vermiform, segmented, retractile, phosphorescent. Number of joints, exclusive of the head, twelve. Legs six, two on each of the three anterior segments, or on those portions underneath representing the pro, meso and metasternum. Length, when extended in walking, two and a quarter inches; and the width across the widest part five-sixteenths of an inch.

Head corneous, shining black and not well defined and when at rest hidden beneath the anterior segment. The prominent character of the head consists of a pair of curved hook-like mandibles like those of the male. Antennæ short, straight, four-jointed; the apical joint bristle-like and growing out from the side of the end of the previous joint, which is the largest and tubular in form.

Maxillary palpi five-jointed, four being nearly equal and bead-like.

Labial palpi appear two-jointed. The antennæ and palpi being short, stand stiffly out from their base.

Dorsal surface consists of twelve thin corneous plates, the three anterior being narrowed in front and all having an impressed line through the center. The plates are shining, blackish brown, margined transversely with transparent olive green, and upon the longitudinal margins with opaque pale yellow interspersed with olive, which colors intermixed obtain upon the sides and the underparts generally.

Spiracles upon the sides of the fourth to the eleventh segments, inclusive, and just below the spiracles on the same segments is a double fold forming a double lateral ridge. The other segments bear but a single fold and no spiracles.

The thoracic region bearing the legs exhibits indistinct sutures and folds presenting but a faint resemblance to analogous parts in other Coleoptera.

The legs are of the type seen in the female in some Lampyridæ and are four-jointed with a short obtuse tarsal claw. The legs in the larval stage of this insect differ from those in the adult by being flattened on the under side into a ridge which is strongly setose, and the claws of all the legs are twice as long, more curved, finer and more sharply pointed than in the fully grown insect.

In Bull. Cal. Acad. Sci., II, 5, p. 71, April, 1886, are to be found some references made by me to a large luminous larva of some coleopteron, and I also gave an account of its habits. This luminous larva, then alluded to, is an earlier stage of the insect I have described above.

The larva fed all winter, and in March sloughed its skin and remained motionless, coiled in a cell of earth for three weeks, and kept a uniform pale-cream color without luminosity, but gradually the center of the dorsal plates became darker, and in the ratio of coloring so was the reappearance of phosphorescent light; when fully restored in strength it became very active and strongly luminous, but it did not eat. In about a week it disappeared beneath the earth, and remained out of sight for nearly a month, and thinking it had changed into the pupa state I disturbed it, and found no change to have taken place. I returned it to the jar, placing the coiled insect upon the top of the earth, where it lay motionless for two days. On the morning of the third day I found it had sloughed another skin, but this time a very thin covering of uniform pale brown, and the insect itself had disappeared into the earth. This last dormant stage must represent its pupa state. I unearthed it again and found it very soon afterwards to assume great activity and bright luminosity, but it would take none of the usual food. Thinking a fresh supply of earth to be beneficial, I removed the jar into the garden and emptied the earth by the stump of a tree, and while in this act several specimens of *Zarhipis* pitched upon the discarded earth, and one specimen dropped swiftly upon the until then supposed larva, throwing the female into violent movements by the suddenness of the attack. The male soon attempted copulation. The act, if it really took place, is not one of adhesion like that

in the Telephoridæ. The method was alike in a number of examples, the attraction of the female was perfect, and through it I captured eleven males.

The light occurs most intense on the cross margins of the dorsal plates, but the luminosity is also strong on all the margins as well as along the lateral edges. Sometimes the insect appears checkered by being banded with phosphorescence.

The eleven males attracted were not all of the form known as *Z. riversi* Horn; some represent the *Z. piciventris* Lec. These facts will cause some revision of the genus.

The foregoing statements can hardly be considered as a perfect history of this peculiar insect, because there are many points not yet worked out.

Why the larva should be luminous, and yet have nothing to attract, and why the adult ♀ should be luminous, while the ♂ is not nocturnal, but roams in the sunlight, are still unanswered questions. The habit of the male is to appear on the wing, in temperate heat, from 9 A. M. to 4 P. M., but during the hottest weather it does not appear until the sun is declining.

Then what are the differences in the larval form of the sexes, or, are there any larval differences of the sexes? The answer to these queries will come after observation; but the answer to the one concerning the luminous characteristics of the larva and adult form may perhaps give way to theory and it may be suggested that the luminous quality is inherited, and though without use to this species having a diurnal habit, yet it may be a derived character that only comes into use when the habit is nocturnal. But it must be considered that the plumose antennæ of the male would indicate that it seeks its mate by scent.—*J. J. Rivers, Univ. of Cal., Berkeley, Cal.*

HISTORY OF THE BUFFALO GNAT.—The report of the U. S. entomologist for 1884 contained an article on the subject of the Southern buffalo gnat (*Simulium* sp. or spp.) which discussed the great damage done to stock each year along the Lower Mississippi and the habits of the allied species in this country and in Europe. At that time the particular species concerned had not been determined nor had the larvæ and pupæ been found. The habits of the insect in its earlier stages were surmised to be similar to those of allied species, but as the species that had been studied, breed, as a rule, in streams that are clear, rapid and rocky, it was a question how the insects bred in such great quantities in the low alluvial Mississippi country. Considering the great damage done by these gnats it was also a question of considerable importance, as its solution might afford a means of checking the increase of the pest. The present spring Dr. Riley has therefore, with the aid of two of his assistants, Mr. F. M. Webster and Mr. Otto Lugger, endeavored to clear up the mystery surrounding this pest, and has already succeeded. Mr. Lugger, whose post has

been at Memphis, Tenn., has found the larvæ and pupæ of one species of *Simulium*, and Mr. Webster, at Vicksburg, has found the earlier stages of another, somewhat larger species. The habits of both species are similar, and both have been found to breed in the more swiftly-running portions of the smaller creeks and bayous which are permanent and do not dry up in midsummer. They are found attached to the masses of drift-wood and leaves which form at points and which, by impeding the streams below, form a more rapid current at the surface. The larvæ and pupæ have been absolutely connected with their respective adults, and a careful study of the general character of the breeding places already indicates that the increase of the pests of late years is indirectly due to the crevasses in the levees, and that we have here another strong argument for the preservation and care of these last.

LARVAL FORM OF *POLYDESMUS CANADENSIS*.—While at Enterprise, Fla., I found, April 8th, under a palmetto log a *Polydesmus canadensis* with its body encircling a mass of white, oval eggs, each about half a millimeter in length and with a thin chorion. They were enclosed in a slight nidus. Placing the eggs and the myriopod, with damp sand and mold, in a close tin box, and bringing them home, I found the young had hatched about the 9th of May. The larva, soon after hatching, is short and thick, the body composed of eight segments and ornamented with scattered, large, somewhat club-shaped spines. The antennæ are four-jointed. There were only three pairs of legs, and they were appended to the first, third and fourth segments respectively, there being none on the second segment behind the head. Length of the animal 1.2^{mm}.

The larva is essentially similar to that of the European *Polydesmus complanatus*, figured by Metschnikoff (*Zeits. wissen. Zool.*, xxiv, pl. xxvi, fig. 7), but apparently has one more segment.—*A. S. Packard*.

OCCURRENCE OF EARLY STAGES OF BLEPHAROCERA.—I send you by express a small package containing specimens of larval forms that I collected last summer at Gilboa, Schoharie county, N. Y. They were all found in the same situation, viz., on the rocks in a water-fall, at the place where the water ran most swiftly, generally on the edge of the rocks. The larvæ of the black fly were so numerous that the edges of rock were black with them. The mode of attachment to the rocks is by a chitinous ring, armed with longitudinal rows of hooks. The tubercle on the prothorax is also provided with a similar disk. These disks served as organs of locomotion as well as of attachment. Just above the disk, at the posterior extremity of the body, on the dorsal surface, there is an opening through which, in many specimens, a tufted organ appears, which I do not remember to have seen in other larvæ.

The intestine in the specimens is solidly packed with the remains of diatoms.

Of the other specimens I send, the one marked No. 3 seems to be the pupal form of No. 2. They were constantly associated, and I saw no other forms near them except the black-fly larvæ. The mode of attachment to the rocks is the same in both, by sucking disks. In No. 3 the disks were on the extremities of the abdominal segments, three on each side. In most cases in removing the specimens from the rock the disks were separated, but there is one specimen I send in which they are still in situ, and are very distinct, and I think they are shown in some of the others.

The protuberances on the dorsal surface of the head of No. 3 I supposed to be breathing organs, as they are composed of lamellæ which the animal had the power to open and close. There were numerous empty cases on the rocks, but they seemed to be only the abdominal disk-bearing segments, the upper or anterior portion being carried away by the rapid flow of water as soon as the animal deserted it.—*Fanny R. Hitchcock.*

[The insects have been identified for us by Dr. C. V. Riley.—*Eds.*]

ENTOMOLOGICAL NOTES.—The Ceylon entomologists propose to systematically observe the singular migrations of butterflies in that island. Volunteers are to watch for the migration and send a post-card bulletin to the editor of the records, noticing data, direction of flight, of wind, the weather and the species.—Professor C. H. Fernald's "Sphinges of New England" gives descriptions of the moths and larvæ, the number of species being forty-two. It will prove to be a very convenient manual of our hawk-moths.—Dr. Uhler's Check-list of the Hemiptera Heterocera, published by the Brooklyn Entomological Society, is a timely publication. It is synonymical, and also gives the geographical distribution of the species. Having been compiled under difficulties it is not to be wondered at that a few species, even some of Dr. Uhler's, have been omitted. The number of described species is 1448.—Mr. W. H. Ashmead has published the seventh of his studies on the North American Chalcididæ.—From Professor F. M. Webster we have received an essay on horticultural entomology, read before the Indiana Horticultural Society.—At the January 10th meeting of the London Zoölogical Society, Mr. H. J. Elwes read a paper on the butterflies of the genus *Parnassius*, with special relation to the development, functions and structure of the chitinous pouch found in the females. He had recognized twenty-three species.—Before the French Academy, J. Gazagnaire read a paper on the seat of the organ of taste in Coleoptera.